

In the Claims

Please cancel claims 10 and 23 without prejudice. Applicants reserve the right to pursue the original subject matter in a continuing application. Please amend claims 1-5, 8-9, 11, 16-19, 21-22, and 27, and add claim 28 as follows.

1. **(Currently Amended)** An optical switch formed on a single substrate, the switch having an input and ~~a plurality of~~ four outputs, comprising:

a first actuator having a first mirror coupled thereto, the first actuator moving the first mirror ~~between at least one~~ into a first extended position, a second extended position, and a retracted position;

a second actuator having a second mirror coupled thereto, the second actuator moving the second mirror ~~between at least one~~ into a first extended position, a second extended position, and a retracted position; and

wherein the first mirror and the second mirror are disposed parallel to each other and offset a distance from each other, and by changing the position of at least one of the first and second mirrors, the output of the switch changes; and

wherein the first mirror includes a notch that lets an optical beam pass through the first mirror without being reflected.

2. **(Currently Amended)** The optical switch of claim 1, wherein when the first mirror is in ~~[[a]]~~ the first extended position and the second mirror is in ~~[[a]]~~ the first extended position, an optical beam input to the switch is reflected by the first mirror and output from the switch at a first output ~~of the plurality of outputs~~.

3. **(Currently Amended)** The optical switch of claim 2, wherein when the first mirror is in the retracted position and the second mirror is in the first extended position, the optical beam input to the switch is reflected by the second mirror and output from the switch at a second output of the plurality of outputs.

4. **(Currently Amended)** The optical switch of claim 3, wherein when the first mirror is in the retracted position and the second mirror is in the retracted position, the optical beam input to the switch passes through the switch without being reflected by the first and second mirrors and output from the switch at a third output of the plurality of outputs.

5. **(Currently Amended)** The optical switch of claim 4, wherein when the first mirror is in ~~[[a]]~~ the second extended position and the second mirror is in ~~[[a]]~~ the second extended position, the optical beam input to the switch is reflected by the first and second mirrors and output from the switch at a fourth output of the plurality of outputs.

6. (Cancelled)

7. (Previously Presented) The optical switch of claim 1, wherein the second mirror includes a notch capable of letting an optical beam pass through the second mirror without being reflected.

8. **(Currently Amended)** The optical switch of claim 1, wherein the first actuator is a double comb drive actuator capable of moving the first mirror into ~~[[a]]~~ the first extended position, ~~[[a]]~~ the second extended position, and the retracted position.

9. **(Currently Amended)** The optical switch of claim 8, wherein the second actuator is a double comb drive actuator capable of moving the second mirror into ~~[[a]]~~ the first extended position, ~~[[a]]~~ the second extended position, and the retracted position.

10. **(Cancelled)**

11. **(Currently Amended)** A method of switching an optical switch, comprising the steps of:

providing first and second actuators having first and second mirrors coupled to the first mirror and second actuators, respectively, the first and second mirrors being disposed parallel to each other and offset a distance from each other in an intersection zone, and the first and second mirrors being capable of reflecting and/or passing through an optical beam, depending on positions of the first and second mirrors, to form a plurality of optical outputs, wherein the first mirror includes a notch that lets an optical beam pass through the first mirror without being reflected;

directing the optical beam to the intersection zone; and

controlling the first and second actuators to position the first and second mirrors to reflect and/or pass the optical beam therethrough to form at least four different optical outputs.

12. **(Original)** The method of claim 11, wherein the step of controlling the first and second actuators comprises a step of extending the first mirror in a first extended position and the second

mirror in a first extended position, the optical beam input to the intersection zone is reflected by the first mirror and output from the intersection zone at a first of the plurality of outputs.

13. (Original) The method of claim 12, wherein the step of controlling the first and second actuators comprises a step of extending the first mirror in a retracted position and the second mirror in the first extended position, the optical beam input to the intersection zone is reflected by the second mirror and output from the intersection zone at a second of the plurality of outputs.

14. (Original) The method of claim 13, wherein the step of controlling the first and second actuators comprises a step of extending the first mirror in the retracted position and the second mirror in a retracted position, the optical beam input to the intersection zone passes through the intersection zone without being reflected by the first and second mirrors and output from the intersection zone at a third of the plurality of outputs.

15. (Original) The method of claim 14, wherein the step of controlling the first and second actuators comprises a step of extending the first mirror in a second extended position and the second mirror in a second extended position, the optical beam input to the intersection zone is reflected by the first and second mirrors and output from the intersection zone at a fourth of the plurality of outputs.

16. **(Currently Amended)** An optical switch, comprising:

a switching component formed in a substrate, comprising ~~[[a]]~~ first and second selectively positionable mirrors, the first mirror including a notch that lets an optical beam pass through the first mirror without being reflected;

an input waveguide formed in the substrate, the input waveguide having an input end and an output end, the output end of the input waveguide being disposed at the switching component wherein by changing positions of the first and second mirrors, an optical beam input which is input into the switching component by the input waveguide is output to one of a plurality of different output waveguides, including:[[;]]

a first output waveguide formed in the substrate, the first output waveguide having an input end and an output end, the input end of the first output waveguide being disposed at the switching component;

a second output waveguide formed in the substrate, the second output waveguide having an input end and an output end, the input end of the second output waveguide being disposed at the switching component;

a third output waveguide formed in the substrate, the third output waveguide having an input end and an output end, the input end of the third output waveguide being disposed at the switching component; and

a fourth output waveguide formed in the substrate, the fourth output waveguide having an input end and an output end, the input end of the fourth output waveguide being disposed at the switching component.

17. **(Currently Amended)** The optical switch of claim 16, wherein the switching component is configurable to determine a path through the switching component to be taken by ~~an~~ the optical beam which is input to the switching component by the input waveguide.

18. **(Currently Amended)** The optical switch of claim 17, wherein the switching component comprises:

a first actuator having the first mirror coupled thereto, the first actuator moving the first mirror between at least one extended position and a retracted position;

a second actuator having ~~[[a]]~~ the second mirror coupled thereto, the second actuator moving the second mirror between at least one extended position and a retracted position; and

wherein the first mirror and the second mirror are disposed parallel to each other and offset a distance from each other, ~~and by changing the position of at least one of the first and second mirrors, the optical beam input by the input waveguide is output to one of the first, second, third, and fourth output waveguides.~~

19. **(Currently Amended)** An 1 X 4 optical switch, comprising:

a switching component having a pair of mirrors, comprising a first mirror including a notch that lets an optical beam pass through the first mirror without being reflected;

an input; and

at least four different outputs, the switching component, the input and the outputs being formed in a single substrate;

wherein each of the mirrors of the pair of mirrors is selectively positionable relative to one another to provide the at least four outputs.

20. **(Original)** The optical switch of claim 19, wherein the mirrors are disposed parallel to each other and offset a distance from each other.

21. **(Currently Amended)** An optical switch formed on a single substrate, the switch having an input and ~~a plurality of~~ four outputs, comprising:

a first actuator having a first mirror coupled thereto, wherein the first actuator is a double comb driver actuator capable of moving the first mirror into a first extended position, a second extended position, and ~~the~~ a retracted position;

a second actuator having a second mirror coupled thereto, the second actuator moving the second mirror ~~between at least one~~ into a first extended position, a second extended position, and a retracted position; and

wherein the first mirror and the second mirror are disposed parallel to each other and offset a distance from each other, and by changing the position of at least one of the first and second mirrors, the output of the switch changes.

22. **(Currently Amended)** The optical switch of claim 21, wherein the second actuator is a double comb drive actuator capable of moving the second mirror into ~~[[a]]~~ the first extended position, ~~[[a]]~~ the second extended position, and the retracted position.

23. **(Cancelled)**

24. **(Previously Presented)** An optical switch formed on a single substrate, the switch having an input and a plurality of outputs, comprising:

a first actuator having a first mirror coupled thereto, the first actuator moving the first mirror between at least one extended position and a retracted position;

a second actuator having a second mirror coupled thereto, the second actuator moving the second mirror between at least one extended position and a retracted position; and

wherein the first mirror and the second mirror are disposed parallel to each other and offset a distance from each other, and by changing the position of at least one of the first and second mirrors, the output of the switch changes;

wherein further when the first mirror is in a first extended position and the second mirror is in a first extended position, an optical beam input to the switch is reflected by the first mirror and outputs from the switch at a first of the plurality of outputs;

wherein further when the first mirror is in the retracted position and the second mirror is in the first extended position, the optical beam input to the switch is reflected by the second mirror and outputs from the switch at a second of plurality of outputs;

wherein further when the first mirror is in the retracted position and the second mirror is in the retracted position, the optical beam input to the switch passes through the switch without being reflected by the first and second mirrors and outputs from the switch at a third of the plurality of outputs; and

wherein further when the first mirror is in a second extended position and the second mirror is in a second extended position, the optical beam input to the switch is reflected by the first and second mirrors and outputs from the switch at a fourth of the plurality of outputs.

25. (Previously Presented) A method of switching an optical switch, comprising the steps of:

providing first and second actuators having first and second mirrors coupled to the first and second actuators, respectively, the first and second mirrors being disposed parallel to each other and offset a distance from each other in an intersection zone, and the first and second

mirrors being capable of reflecting and/or passing through an optical beam, depending on positions of the first and second mirrors, to form a plurality of optical outputs;

directing the optical beam to the intersection zone; and

controlling the first and second actuators to position the first and second mirrors to reflect and/or pass the optical beam therethrough to form at least four optical outputs

wherein the step of controlling the first and second actuators comprises a step of extending the first mirror in a first extended position and the second mirror in a first extended position, and wherein the optical beam being input to the intersection zone is reflected by the first mirror and outputs from the intersection zone at a first of the plurality of outputs;

wherein further the step of controlling the first and second actuators comprises a step of extending the first mirror in a retracted position and the second mirror in the first extended position, and wherein the optical beam being input to the intersection zone is reflected by the second mirror and outputs from the intersection zone at a second of the plurality of outputs;

wherein further the step of controlling the first and second actuators comprises a step of extending the first mirror in the retracted position and the second mirror in a retracted position, and wherein the optical beam being input to the intersection zone passes through the intersection zone without being reflected by the first and second mirrors and outputs from the intersection zone at a third of the plurality of outputs; and

wherein further the step of controlling the first and second actuators comprises a step of extending the first mirror in a second extended position and the second mirror in a second extended position, and wherein the optical beam being input to the intersection zone is reflected by the first and second mirrors and outputs from the intersection zone at a fourth of the plurality of outputs.

26. (Previously Presented) The optical switch of claim 1, wherein the first and second actuators are positioned to generally oppose one another.

27. **(Currently Amended)** The optical switch of claim 16, wherein the switching component includes only two mirrors, ~~including the first mirror and a second mirror.~~

28. **(New)** An optical switch, comprising:

a switching component formed in a substrate, the switching component having only two mirrors, including a first mirror and a second mirror, the first mirror having a notch that lets an optical beam pass through the first mirror without being reflected;

an input waveguide formed in the substrate, the input waveguide having an input end and an output end, the output end of the input waveguide being disposed at the switching component;

a first output waveguide formed in the substrate, the first output waveguide having an input end and an output end, the input end of the first output waveguide being disposed at the switching component;

a second output waveguide formed in the substrate, the second output waveguide having an input end and an output end, the input end of the second output waveguide being disposed at the switching component;

a third output waveguide formed in the substrate, the third output waveguide having an input end and an output end, the input end of the third output waveguide being disposed at the switching component; and

a fourth output waveguide formed in the substrate, the fourth output waveguide having an input end and an output end, the input end of the fourth output waveguide being disposed at the switching component.